

CONNECTIONS

For creating opportunity and advantage

Corporate Research
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Directions

TECHNOLOGY'S PLACE IN THE MARKETING MIX

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As we look at all five "P's" of the marketing mix--products, place, price, promotion, and people--new technology continues to play a strong role in our future strategy. What is our strategy? Bill Stevens, our President, said it best in the Fall 1988 issue of CONNECTIONS:

"In the downstream, EUSA's straightforward objective is to be the most effective competitor in an exceptionally tough marketplace. A focused effort is underway to enhance the quality image of Exxon products and services to differentiate them from those of competitors. This addresses the fundamental requirement of the downstream effort: to anticipate and identify customers' needs quickly and accurately, and to move swiftly to meet them."

Bill's statement recognizes that customers are the sole reason we are in business. And we remind ourselves of this as we develop marketing plans to manage our five "P's."

Success in our business is determined by the edge that raises the

value of our offering above that of competition in the eyes of customers. The bigger the edge, the better. Our enormous strength in technology is an Exxon edge. Whether we derive that by reducing our costs or increasing our sales, our strongest motive is to use new technology to improve our prominence and success in the marketplace.

Let's examine the five "P's" and see where technology might lead us.

Products

Customers look for products that meet their needs and provide efficient service--performance that reduces maintenance and waste. Examples are gasolines that measure up to the demands of sophisticated, modern engines; motor oils that reduce wear, corrosion, and fouling; metal-rolling oils that eliminate production rejects.

Our fuels and specialty products are constantly improved with customer

needs in mind. Surprisingly, the average life cycle of our products is a very short three years. This emphasizes the need to generate and advance new product ideas quickly.

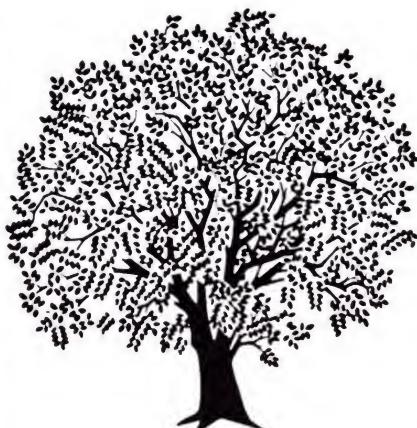
Increasingly, we see that product advances must apply new understandings of chemistry and physics. We continue to look for new additives to provide differentiable performance and have begun to look for new ways to derive or create performance advances in the base fuels and specialties themselves.

Place

Our customers tell us that their time is precious and that convenience is critical. Thus, if our stores are not in locations that customers find convenient, we will not do much business.

Another "place" factor is our offering--full and self-service, repairs, convenience products, car wash, and so on. Another is layout--how the offering is placed on the property to promote smooth traffic flow and purchasing convenience. Yet another factor is style--the look and the feel of the store that make our customers like being there.

Many outside of Marketing are surprised to learn there is a great deal of science behind "place." Using complex models of traffic flow, demographics, and purchasing behavior to design our sites, we "marry" the social sciences and engineering.



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GREENHOUSE SCIENCE

by Brian Flannery

Shortly after I joined Exxon in 1980, I was asked to study the enhanced Greenhouse Effect. Nearly a decade ago, Corporate Research believed that this issue would some day have profound importance for the petroleum industry. We felt then--and now--that CR could best serve Exxon by gaining comprehensive understanding through participating in the science. With a background in theoretical astrophysics and modeling and a longstanding interest in earth science, I felt that this would be an exciting challenge.

Today, headlines and international panels address greenhouse concerns. Our program, begun when many people thought that greenhouse was an issue for the next century, has led increasingly to interactions with other concerned employees, affiliates, corporate management, federal agencies, and the international community organizing to respond to the issue.

The idea that man might change the atmosphere enough to alter climate is neither obvious nor preposterous: it is a fit subject for scientific inquiry. We now know that concentrations of trace atmospheric gases are growing at a rate that could impact human and natural systems through global warming and associated climate change.

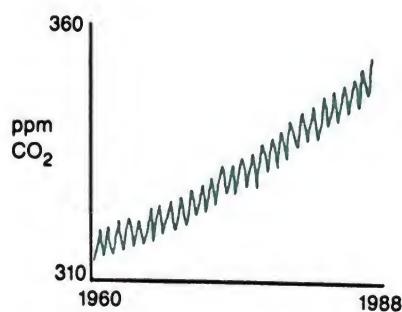
We also know that the modeled projections are far from certain: potential impacts could be small and manageable or they could be profound and irreversible. Uncertainty arises from incomplete scientific understanding--and missing data--to describe the role of fundamental processes such as cloud formation and oceanic circulation, that are known to be important in predicting climate change. Available data display such large natural fluctuations that, today, observations neither confirm nor refute the possibility of climate change from an enhanced Greenhouse Effect. The complexity of the effect and the lack of

data caution us that the science is unlikely to provide definitive forecasts for decades.

Emissions of important greenhouse gases, such as carbon dioxide, methane, chlorofluorocarbons, and nitrous oxide, occur from basic, everyday human activities including energy generation from burning coal, oil, gas, and wood; agriculture; land use, especially deforestation; and manufacturing. Projections indicate that emissions will increase to meet the economic aspirations of a growing global population.

Proposed actions to address climate change require significant international cooperation and human effort. Today, CO₂ emissions contribute about half the forcing leading to a potential enhancement of the Greenhouse Effect. Since energy generation from fossil fuels dominates modern CO₂ emissions, strategies to limit CO₂ growth focus near term on energy efficiency and long term on developing alternative energy sources. Practiced at a level to significantly reduce the growth of greenhouse gases, these actions would have substantial impact on society and our industry--near term from reduced demand for current products, long term from transition to entirely new energy systems. Obviously, the issue directly affects Exxon's long-term planning including many R&D programs.

At CR, our program goals are to contribute to scientific understanding and to maintain a critical awareness of both scientific developments and society's efforts to address the issue. We perform scientific research, support selected external studies, contribute to Exxon's environmental assessments, and participate in appropriate institutional forums.



Our internal research program forms the core of our activities. In 1990, the U.S. government will spend nearly \$190 million to study climate change. Obviously, we need not compete with that level of research or with resources that include institutional-scale modeling and satellite observations. Instead, we utilize simpler models to study essential physics and chemistry in a way that lets us assess the role of particular processes--such as the influence of the marine biosphere. These models also serve as a tool to analyze the effectiveness of proposed policies to limit change.

Impacts on Exxon will come sooner from society's efforts to reduce potential risks from climate change than from change itself. Proposals before Congress call for reductions in U.S. emissions of CO₂ by as much as 20% by the year 2000. Internationally, some proposals call for even more stringent reductions. Recognizing the potential for such responses to alter profoundly the strategic direction of the energy industry, we have briefed Exxon corporate and regional management, describing the current state of the science and efforts to address the greenhouse issue. We have provided similar briefings to interested Exxon employees, to affiliates, and to petroleum and other industry groups.

The Greenhouse Effect surged to the center of attention last year when the hot summer and drought brought home the potential consequences of climate change. Now that the drought has ended (and been acknowledged as a natural weather fluctuation), media attention has decreased. Nonetheless, the Greenhouse Effect remains prominent on the international environmental agenda. Next year the Intergovernmental Panel on Climate Change will issue reports on science, impacts, and response strategies as a framework for a proposed 1992 international convention to limit climate change.

While uncertainty exists, science supports the basic idea that man's actions pose a serious potential threat to climate. Efforts to minimize that risk will influence the future direction of the energy industry.